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ABSTRACT

This study examines the effect of cooperative versus individual learning strategies and the need for affiliation on achievement, attitude, and student interactions when receiving instructional television lessons. Subjects (n=126) were undergraduate education majors enrolled in a required course in educational psychology. Subjects classified as high or low affiliation used either a cooperative or individual learning strategy while receiving instruction from a television lesson. Study participants completed a need for affiliation scale, viewed an instructional television program on objectives-based assessment, answered questions for practice and read feedback sections in a workbook, and took a posttest following the program. The television lesson was designed following a competency-based approach and included objectives, information, examples, practice, feedback, and review. Results include: (1) there was no significant difference between subjects who used cooperative and individual learning strategies when overall achievement and application were tested; (2) subjects who worked alone performed significantly better on the knowledge portion of the posttest than those who worked cooperatively; (3) the need for affiliation was related to attitude toward future learning activities; and (4) the need for affiliation was related to student interaction behaviors. Study results indicate that cooperative learning does not always increase learning from instructional television that has been systematically designed. (Contains 24 references.) (SWC)

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Effects of Cooperative Learning and Affiliation During an ITV Lesson

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Over the past two decades, a number of researchers have examined the effect of cooperative learning on student achievement and motivation. Reviews of research have generally suggested that cooperative learning has a positive influence on student achievement, productivity, transfer of learning, time on task, and attitude (Johnson & Johnson, 1989; Sharan, 1980; Slavin, 1990). According to Widaman and Kagan (1987), the results of these reviews have led many educators to erroneously conclude that cooperative learning is superior to traditional instruction for all students because it results in greater achievement by average students. However, even advocates of cooperative learning have indicated that some learners are more predisposed than others to act cooperatively (Johnson and Johnson, 1989) and that this predisposition may influence how students cooperate when they work with others (Slavin, 1983).

There is some empirical evidence that a student's need for affiliation may influence outcomes in a cooperative learning setting. The need for affiliation is represented by a desire to participate in cooperative, noncompetitive activities and by a desire for close, friendly relationships with others (McClelland, 1965, 1976). Individuals with a high need for affiliation are more friendly, sociable, and cooperative than those with a low need for affiliation (Jackson, 1974). A recent study by Klein and Pridemore (1992) revealed that need for affiliation interacted with cooperative/individual learning to influence performance and attitude. College students with high affiliation need who worked alone performed worse than students in all other conditions when asked to apply what they had learned. Furthermore, Chan (1980-81) found that high school students with high need for affiliation reported better attitudes toward cooperative learning than those with low need for affiliation after using both cooperative and individual instruction.

A few other researchers have reported that social orientation may influence how students perform in cooperative learning settings. Hall et al. (1988) found that pairs of college students with moderate to high levels of social orientation outperformed pairs with low levels of social orientation; students with a low social orientation performed better when working alone. Widaman and Kagan (1987) reported that cooperatively-oriented elementary school students performed better when placed in cooperative learning structures, while competitively-oriented students performed better in competitive learning structures. Sutter and Reid (1969) found that college students with high levels of sociability performed better than introverted students on cooperative computer-assisted instruction, while introverted students performed better on individual CAI. Finally, Jones (1995) found that pairs of college students with a high preference for group work spent more time working through computer instruction, exhibited more cooperative behaviors, and more off-task behaviors than pairs with a low preference for group work.

The purpose of the current study was to examine the effect of cooperative versus individual learning strategies and the need for affiliation on achievement, attitude, and student interactions. The study is a continuation of a program of research on how cooperative learning can be effectively implemented with instructional television. Johnson & Johnson (1994) have suggested that informal cooperative learning structures such as paired discussions can ensure that students are cognitively active during the presentation of a videotape. Furthermore, Adams, Carson, and Hamm (1990) have speculated that cooperative strategies will enhance learning and motivation when instructional television is presented to students. However, few research studies have been conducted to examine the effect of using cooperative learning strategies with instructional television.

In this study, subjects classified as high or low affiliation used either a cooperative or individual learning strategy while receiving instruction from a television lesson. Based on previous research, it was hypothesized that instructional condition would interact with need for achievement to influence learning and attitude. It was expected that high affiliation students would achieve more and report better attitudes under the cooperative condition and that low affiliation students would achieve more and report better attitudes under the individual condition. Furthermore, it was hypothesized that high affiliation dyads would exhibit more cooperative interactions and more off-task interactions than low affiliation dyads.

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Method

Design and Subjects

A 2 X 2 factorial design was used in this study, with instructional method (individual versus cooperative) and need for affiliation (high versus low) as the independent variables. The dependent variables were achievement and attitude. Data for student interaction behaviors were also collected for subjects in the cooperative treatment.

Subjects were 126 undergraduate education majors (34 males, 92 females) enrolled in the first semester of a teacher training program at a large southwestern university. All subjects were enrolled in a required course in educational psychology. Although students in this course were required to participate in one research study during the semester, participation in this particular study was voluntary.

Materials

Materials used in this study were an instructional television lesson and an instrument to measure the need for affiliation. The instructional television lesson was from the series Instructional Theory: A nine unit mini-course (Gerlach, 1973). The lesson included a videotape and a workbook that provided instruction on the topic of objectives-based assessment. The videotape was divided into seven segments which presented information and examples on the content of the lesson. The videotape portion of the lesson was approximately 30 minutes in length. After each segment, the videotape instructed subjects to turn to their workbook for practice and feedback on the content presented in that segment. For example, Segment 4 provided instruction on the use of paper-and-pencil tests, interviews, and observations of student performance or product. After providing information and examples of these three types of objectives-based assessment, the tape presented viewers with three instructors who wished to evaluate a student's work of sculpture. The videotape directed subjects to "Turn to Exercise 4 in your workbook" where they were asked to "Describe the best type of objectives-based assessment for this situation." The workbook then provided written feedback to this practice item on the following page.

The affiliation scale of the Personality Research Form-E was used to measure need for affiliation. This scale consists of 16 items that measure the degree to which an individual is motivated to affiliate with others. A true-false format is used to indicate whether or not a person agrees with statements such as "Sometimes I have to make a real effort to be social" and "I spend lots of time visiting friends." According to Jackson (1974), a high score on this scale suggests that the individual enjoys being with other people, accepts people readily, and makes an effort to have friends and maintain associations with others. Norming data indicate that the mean for this scale is 8.6 (SD = 3.35) and that the internal consistency reliability is .86 when used with college students (Jackson, 1974). For subjects in the current study the mean was 9.98 (SD = 3.59), and the range was 2 - 16.

Procedures

Several weeks before the treatments were implemented, all subjects completed the need for affiliation scale. A median split was used to block subjects into high and low categories of affiliation. Subjects with scores at or above the median (Md = 10) were assigned to the high affiliation category (M = 12.4, SD = 2.0, n = 75) and those with scores below the median were assigned to the low affiliation category (M = 6.4, SD = 2.1, n = 51). Subjects blocked by affiliation score were randomly assigned to one of the two treatment conditions (cooperative or individual). Cooperative dyads were then formed by randomly pairing subjects from the same affiliation category (i.e., a high affiliation subjects were paired and a low affiliation subjects were paired).

During the study, each treatment condition was implemented in separate rooms; each room had more than one individual or dyad present at a time. Subjects in both treatment conditions were informed that they would be viewing an instructional television program on objectives-based assessment and that they would be using a workbook to receive practice and feedback on the content of the lesson. Subjects were told to write the answer to each practice exercise in the workbook and read the feedback that followed each exercise. Additionally, all subjects were informed that a short test would follow the lesson.

Subjects received specific directions for implementing individual versus cooperative strategies. Subjects working alone were each given a workbook, instructed to work independently during the lesson, and told to do their best work. Individuals were also informed that they would receive bonus points toward their course grade if they achieved 90% or better on the lesson test. Each cooperative dyad was given a workbook and told to work together during the lesson, discuss all practice exercises and any disagreements over the answers, and discuss the given

feedback. Cooperative subjects were also informed that they would individually complete the lesson test and would receive bonus points if both partners achieved 90% or better on this test.

After the above instructions were provided, the videotape was started for each treatment condition. When Segment 1 was completed, the tape was stopped and subjects completed Exercise 1. When subjects indicated that they were ready, the videotape was started again. This cycle was continued until all seven sections of the lesson were completed.

During the lesson, observers watched the dyads work and recorded instances of student interactions. An observer also watched individuals work and took notes on their behaviors. Upon completion of the lesson, all workbooks were collected and each subject individually completed an attitude survey. Each subject then took the posttest.

Criterion Measures

Criterion measures used in this study were student achievement and attitude. In addition, student interaction behaviors for subjects in the cooperative treatment were observed and recorded.

Achievement was measured using a 15-item, constructed response posttest. The items were developed to evaluate student mastery of the instructional objectives for the lesson on objectives-based assessment. The posttest measured both application and knowledge of the lesson content. The application portion of the test consisted of ten items and the knowledge portion consisted of five items. Each section of the test was worth a total maximum score of ten points. Individual answers were checked against a scoring key and points were assigned for each answer. Partial credit was given for questions that required a multiple response such as "List three types of objectives-based assessment." The internal-consistency reliability of this posttest was .86 (Klein, Erchul, & Pridemore, 1994).

Attitude was assessed using a 10-item, paper-and pencil survey. This survey consisted of six questions from the Instructional Materials Motivation Scale (Keller, 1986) that measured student satisfaction toward instructional activities and four items that assessed the degree to which a student would be willing to return to tasks like those used in the study. A five-point Likert scale (1 = not true, 5 = very true) was used to respond to the following items:

(1) Participating in the activity gave me a satisfying feeling of accomplishment;
(2) The practice and feedback helped me feel satisfied while participating in the activity;
(3) I enjoyed the activity so much that I would like to participate in a similar activity;
(4) I really did not enjoy the activity;
(5) It felt good to successfully complete this activity;
(6) It was a pleasure to work on such a well-designed activity;
(7) I would like to receive more instructional television lessons in the future;
(8) I would like to learn more about objectives-based assessment in the future;
(9) I would like to participate in future activities that allow me to work with another person;
(10) I would like to participate in future activities that allow me to work by myself.

The Cronbach alpha internal-consistency reliability estimate of this survey was .83.

The number of student interactions exhibited by cooperative dyads were observed and recorded on an observation sheet. This observation sheet included interaction behaviors that other researchers have suggested as necessary for successful group work (Klein & Doran, 1997; Klein & Pridemore, 1994; Webb, 1982, 1987). These interaction behaviors were grouped into the four categories of helping behaviors (asking questions, answering questions, giving unsolicited hints, suggestions, or explanations) on-task group behavior (taking turns, sharing materials, group discussion of content), on-task individual behavior (assuming control, taking notes, working alone), and off-task behavior (talking to other about something unrelated to the lesson and non-verbal actions such as reading a newspaper).

A trained observer was stationed among five dyads to observe each dyad for two minute intervals during the lesson. The observer placed a mark on the observation sheet when a dyad exhibited an interaction behavior. Prior to the study, observers watched a videotape of one dyad working through a lesson and used the data collection form to record interaction behaviors. Reliability of observations was based on observers having similar totals for each set of behaviors exhibited by this videotaped dyad. The inter-rater reliability between observers was .90 for helping behaviors, .75 for on-task group behaviors, .90 for on-task individual behaviors, and 1.0 for off-task behaviors.

Data Analysis

Data for 122 subjects were included in the analyses, since inspection of residuals indicated that posttest scores for four subjects were extreme outliers ($z > 2.25$). Multivariate analysis of variance (MANOVA) was used to test for an overall difference between groups on the posttest. This analysis was followed by univariate analyses on the knowledge and application portions of the test. MANOVA was also used to test for an overall difference between groups on the attitude survey. This analysis was followed by univariate analyses on the individual attitude items. The number of interaction behaviors exhibited by subjects in the cooperative treatment were totaled for 26 dyads and separate chi-square analyses were conducted on each category of interaction behavior. Interaction data for five high affiliation dyads were randomly eliminated prior to conducting these analyses in order to create a balanced design (13 high and 13 low affiliation dyads). Alpha was set at .05 for all statistical tests.

Results

Achievement

Achievement was measured using the 15-item, constructed response posttest. The posttest measured both knowledge and application of the lesson content. Mean scores and standard deviations for both portions of the posttest can be found in Table 1.

Table 1. Mean Scores and Standard Deviations for Achievement

Type of Items Condition		Knowledge	Application	Total
Individual Learning				
Low Affiliation	M	5.42	7.08	12.17
(n = 24)	SD	2.19	1.70	2.77
High Affiliation	M	5.67	5.60	12.33
(n = 36)	SD	1.76	1.15	2.13
Total	M	5.57	6.26	12.26
(n = 60)	SD	1.93	1.58	2.39
Cooperative Learning				
Low Affiliation	M	4.54	6.83	12.90
(n = 26)	SD	2.06	1.52	3.41
High Affiliation	M	5.00	6.81	12.96
(n = 36)	SD	2.11	1.03	3.34
Total	M	4.81	6.82	12.93
(n = 62)	SD	2.09	1.29	3.32

A MANOVA conducted on the posttest data did not reveal a significant multivariate effect for either instructional method or need for affiliation. However, univariate analysis conducted on each section of the posttest revealed that instructional method had a significant effect on knowledge acquisition $F(1, 118) = 4.32$, $p < .05$. Subjects who worked alone ($M = 5.57$, $SD = 1.93$). performed significantly better on the knowledge portion of the posttest than those who worked cooperatively ($M = 4.81$, $SD = 2.09$). No other results were found for achievement.

Attitude

Attitude was measured using the 10-item survey. MANOVA revealed a significant main effect for instructional method $F(10, 109) = 2.26$, $p < .05$. Univariate analyses indicated that subjects who worked alone were significantly more likely than those who worked cooperatively to agree with the statement: I would like to participate in future activities that allow me to work by myself, $F(1, 118) = 4.59$, $p < .05$.

MANOVA also revealed a significant main effect for affiliation, $F(10, 109) = 2.29$, $p < .05$. High affiliation subjects were significantly more likely than low affiliation subjects to agree with the statement: I would like to participate in future activities that allow me to work with another person, $F(1, 118) = 7.34$, $p < .05$. Furthermore, low affiliation subjects were more likely to agree with the statement: I would like to participate in future activities that allow me to work by myself, $F(1, 118) = 3.67$, $p = .058$.

Student Interactions

High affiliation dyads exhibited 90 helping behaviors, 97 on-task group behaviors, 47 on-task individual behaviors, and 25 off-task behaviors. Low affiliation dyads exhibited 92 helping behaviors, 67 on-task group behaviors, 57 on-task individual behaviors, and 8 off-task behaviors. Chi-square analyses were performed on each of the four categories of student interactions to determine the influence of affiliation. These analyses indicated a significant difference between high and low affiliation dyads on two of the four behaviors. Results revealed that high affiliation dyads exhibited significantly more on-task group behaviors (discussion of content, sharing materials, taking turns) than low affiliation dyads, $^2 = 5.49$, $p < .05$. In addition, high affiliation dyads exhibited significantly more off-task behaviors than low affiliation dyads, $^2 = 15.13$, $p < .05$.

Discussion

The purpose of this study was to examine the effect of cooperative versus individual learning and the need for affiliation on achievement, attitude, and student interactions. College students classified as high or low affiliation used either a cooperative or individual learning strategy while receiving instruction from a television lesson. Results did not reveal a significant difference between subjects who used cooperative and individual learning strategies when overall achievement and application were tested. This is likely due to the instructional materials used in the study. The television lesson was designed following a competency-based approach and included objectives, information, examples, practice, feedback, and review. Some researchers have suggested that studies comparing individual and cooperative learning strategies do not consistently favor small group methods when well designed instructional materials are used (Bossert, 1988-89; Cavalier, 1996; Klein & Doran, 1997; Snyder, 1993). Others have indicated that many studies which produce positive results in favor of cooperative learning have compared carefully designed materials for groups to poorly designed instructional materials for individuals (Bossert, 1988-89). In the current study, subjects in both the individual and cooperative treatments used well designed instructional materials.

While overall achievement and application were not influenced in this study, results indicated that subjects who worked alone performed significantly better on the knowledge portion of the posttest than those who worked cooperatively. Furthermore, subjects who worked alone expressed better attitudes than those who worked cooperatively toward future activities that require individual work. These findings partially support the work of others who have suggested that individual strategies may be more effective than cooperative strategies for enhancing learning and motivation during instructional television lessons (Klein, Erchul, & Pridemore, 1994).

Results of the current study also revealed that need for affiliation was related to attitude toward future learning activities. It is not surprising that high affiliation students expressed a positive attitude toward future group work and that low affiliation subjects expressed a positive attitude toward future individual activities. Other researchers have reported that need for affiliation is related to attitudes when student implement individual and cooperative learning methods (Chan, 1980-81; Klein & Pridemore, 1992).

In addition to attitudes, results indicated that need for affiliation was related to student interaction behaviors. High affiliation dyads exhibited significantly more on-task group behaviors (discussion of content, sharing materials, taking turns) and significantly more off-task behaviors than low affiliation dyads. These results support the notion that individuals with a high need for affiliation are more cooperative and social than those with a low need for affiliation (Jackson, 1974; McClelland, 1976). The findings are also consistent with results reported by Jones (1995) who found that pairs of college students with a high preference for group work exhibited more cooperative behaviors and more off-task behaviors than pairs with a low preference for group work.

Combined with previous research, the current study provides some implications for educators who plan to implement cooperative learning strategies with media that was originally designed for individual learning. Results suggests that educators should consider student characteristics such as need for affiliation when forming cooperative learning groups. Furthermore, while some theorists have suggested that cooperative learning structures can enhance active learning during videotaped instruction (Adams, Carson, & Hamm, 1990; Johnson & Johnson, 1994), the current study indicates that cooperative learning does not always increase learning from instructional television that has been systematically designed. Future research should continue to examine the effect of learning structures and student characteristics when students participate in mediated lessons.

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